SHORTER CONTRIBUTIONS

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MACROLOPHUS BREVICORNIS ON *TRIOSTEUM PERFOLIATUM* IN VIRGINIA: STATE RECORD AND NEW HOST-PLANT RECORD FOR MIRIDAE (HEMIPTERA: HETEROPTERA) -- Many dicyphine plant bugs—mirids of the subfamily Bryocorinae, tribe Dicyphini, subtribe Dicyphina (*sensu* Schuh, 1995)—are omnivores on glandular-hairy ("sticky") plants. The bugs not only feed on their hosts but also prey on small arthropods and scavenge insects that alight on the plants and become entrapped in glandular exudations (Spomer, 1999; Wheeler, 2001). Several dicyphines native to Europe have been used in greenhouses to control pests such as aphids, thrips, and whiteflies. The Palearctic bugs used in biological control are prohibited from being introduced into North America; as omnivores, they could become plant pests (e.g., Alomar & Albajes, 1996; Wheeler, 2001; Sanchez et al., 2004). North American entomologists, therefore, have investigated native dicyphines as potential biocontrol agents (McGregor et al., 1999, 2000; Sanchez et al., 2003, 2004; McGregor & Gillespie, 2004).

Recently, the Nearctic dicyphine *Dicyphus vestitus* Uhler was recorded from heart-leaved skullcap, *Scutellaria ovata* J. Hill (Lamiaceae), in Virginia shale barrens. Virginia represented the southeasternmost record of this mirid in the eastern United States, and heart-leaved skullcap was the first host plant documented for this bug (Henry, 1999).

On 7 May 1993, I discovered another little-known dicyphine that proved to be a new record for Virginia when Thomas Rawinski took me to a dolomite glade ("Dixie Cliff") near Glenvar in Roanoke County. I was interested in the glade because of its colonies of moss phlox, *Phlox subulata* L., a mat-forming member of the Polemoniaceae that harbors a diverse insect fauna (Wheeler, 1995a, b). During the visit to Dixie Cliff, I found late instars of a dicyphine mirid in thin woods at the base of the glade's south-facing slope (37° 15.2' N, 80° 10.4' W). Nymphs were on horse-gentian (also known as feverwort or wild coffee), *Triosteum perfoliatum* L. (Caprifoliaceae). I was not aware of mirids known from this plant and wanted to determine the bug's identity.

Fifth instars were collected and held at 22-24°C in a small plastic box (ca. 8 x 2 cm) with excised horse-gentian shoots; the stems were wrapped with moist cotton. Adults appeared on 13 May. I returned to Dixie Cliff in late May to collect additional adults, which Thomas Henry identified as *Macrolophus brevicornis* Knight. Voucher specimens have been deposited in the National Museum of Natural History, Smithsonian Institution, Washington, DC.

Macrolophus Fieber is a Holarctic genus that includes five Nearctic species. The species in eastern North America, in addition to *M. brevicornis*, are *M. separatus* Uhler and *M. tenuicornis* Blatchley (Henry & Wheeler, 1988; Schuh, 1995; Maw et al., 2000). Knight (1926) provided a key to the three eastern species.

Macrolophus brevicornis was described by Knight (1926) from Iowa, Kansas, Maryland, Missouri, and New Jersey. Since the original description, only Illinois (Knight, 1941) and Kentucky (Henry et al., 2005) have been added to the distribution. Biological information on this seldom-collected mirid is limited to its collection from two plant species: a milkweed, *Asclepias* sp. (Asclepiadaceae), in Iowa (Knight, 1941), and a ground-cherry, *Physalis* sp. (Solanaceae), in Kentucky (Henry et al., 2005). Knight (1941) noted "breeding" on milkweed, implying that nymphs were observed. Certain true bugs, or heteropterans, such as lygaeine Lygaeidae (Price & Willson, 1979; Slater & Baranowski, 1990), specialize on asclepiads, but specialization by North American mirds on these cardenolide-rich plants is unknown (Knight, 1941, 1968; Schuh, 1995; Wheeler, 2001).

Additional observations are needed to determine if *M. brevicornis* actually develops on milkweeds; the bug apparently has not been recorded from *Asclepias* since Knight's (1941) report. *Macrolophus brevicornis*, however, has been collected consistently on glandular species of *Physalis* (A.G.W., unpubl. data). *Triosteum perfoliatum* apparently can be added to the bug's known host-plant range. I also found two adults on this plant in a Maryland shale barren (Washington Co., Sideling Hill Wildlife Management Area, near Little Orleans) in mid-June 1994.

The mirid's seasonal history on *T. perfoliatum* is incompletely known. Third through fifth instars were observed at Dixie Cliff in early May 1993; by 28 May, adults predominated (23 were collected) with fewer than 10 fifth instars found. No individuals of *M. brevicornis* were observed on 3 July. In 1994, fourth and fifth instars were found on 20 May, mostly on lower (abaxial) leaf surfaces. Whether more than one generation is produced is unknown. *Macrolophus tenuicornis*, the only eastern species of the genus that has been studied, is bivoltine in Pennsylvania (Wheeler et al., 1979).

Horse-gentian is a densely glandular-hairy herb (Gleason & Cronquist, 1991; Rhoads & Block, 2000), although its exudate appears not to entrap small

arthropods. Glandular trichomes presumably evolved as a defense against herbivory by small arthropods (Levin, 1973; Duffey, 1986; Gregory et al., 1986; Sugiura & Yamazaki, 2006) and provide greater protection than nonglandular trichomes (Duke, 1994; van Dam & Hare, 1998). Glandular trichomes are toxic to certain herbivores and can deter oviposition, impede movement, and alter feeding behavior, as well as the searching behavior of their natural enemies. Sticky plants tend to be "off limits" to most generalist herbivores, which cannot traverse the glandular surfaces. Benefits to plants from reduced herbivory can be offset by the adverse effects of glandular trichomes on herbivores' parasitoids and predators (van Dam & Hare, 1998; Gassmann & Hare, 2005). Plants might also benefit by digesting and absorbing proteins from trapped insects (protocarnivory) (Spomer, 1999) or obtaining supplemental nitrogen when trapped insects decay and the breakdown products leach into the soil (Eisner, 2003).

Omnivorous insects generally have broader host-plant ranges than strict herbivores (Eubanks et al., 2003). Dicyphine mirids, as well as many stilt bugs (Berytidae) (Wheeler & Schaefer, 1982; Henry, 1997; Henry & Froeschner, 1998), associated with glandular-pubescent plants tend to be omnivores and might be more polyphagous than members of their respective families that develop on nonglandular hosts. The berytid *Jalysus spinosus* (Say), for example, feeds on unrelated sticky dicots and monocots (Wheeler & Henry, 1981; Wheeler, 1986, 1994). Studies on omnivorous heteropterans that specialize on sticky plants, similar to the study of terrestrial heteropterans that are omnivores (Eubanks et al., 2003), likely would yield insights into the ecological significance of associations with glandular plants and the evolutionary consequences of such specialization.

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OBSERVATIONS ON A MALFORMED AMERICAN BULLFROG (*RANA CATESBEIANA*) FROM FAIRFAX COUNTY, VIRGINIA -- Globally, herpetologists are concerned about amphibian population declines, extinctions, infections, and numerous reports of malformations. Most amphibians have life histories that include terrestrial and aquatic forms at different developmental stages, making them bio-indicators of both land and water health. Although malformations are not uncommon in animals, documentation of these abnormal morphologies in the literature help us better track their distribution and prevalence and can warn of potential environment problems if found in high numbers or concentrated areas. Many malformations are natural errors that occur in early development but some malformations can be linked to chemical teratogens and parasitic infections (Gilbert, 1991, Sessions, 2003). In this report, we document an American Bullfrog (*Rana catesbeiana*) with multiple malformations in its head region.

On 5 June 2006, one of us (TB) captured a female American Bullfrog (SVL 74 mm; 29 g) sitting in duckweed (*Lemna* spp.) in a shallow (1 m deep), old fish pond. The pond is located in Fairfax County, Virginia, just north of the Tre Towers Court and Braddock Road (Rt. 620) intersection (38° 52' 49.28" N, 77° 28' 47.88" W [NAD 83]). Several malformations were evident upon close visual inspection. A morphologically normal bullfrog was observed next to the malformed frog. The captured frog has the following malformations: anophthalmia (missing left eye) and missing orbit, right external nare absent, reduced tympanic ridge length on left side, asymmetry of the position of the left and right tympanic membranes, and asymmetry of left and right premaxilla and nasal bones (Fig. 1). A pigment spot (diameter 2 mm) of the same coloration as the tympanic membrane exists where the eye would normally be located. These malformations do not appear to be the result of injury or parasitic infection but rather congenital in origin. The frog was able to capture crickets and did not exhibit atypical behavior while being observed in captivity. Gross and minor motor functions appeared intact and typical for the species.